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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/654,760	05/29/96	VORA M	V&F-001

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EXAMINER	
GIORDANA, A	
ART UNIT	PAPER NUMBER
2508	

DATE MAILED: 03/10/98

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/654,760	Vora
Examiner	**Group Art Unit**
Adriana Giordana	2508

☒ Responsive to communication(s) filed on *Nov 19, 1997* .

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-5* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-5* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☒ The proposed drawing correction, filed on *Nov 24, 1997* is ☐approved ☒disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Drawings

1. **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

1. Correction of Informalities -- 37 CFR 1.85; 1097 O.G. 36

New formal drawings must be filed with the changes incorporated therein. The art unit number, application number (including series code) and number of drawing sheets should be written on the reverse side of the drawings. Applicant may delay filing of the new drawings until receipt of the "Notice of Allowability" (PTO-37). If delayed, the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability" (PTO-37) to avoid extension of time fees. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a) for filing the corrected drawings (but not for payment of the issue fee). The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, **A HIGHLIGHTED (PREFERABLY RED INK) SKETCH OF THE CHANGES** to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the three month shortened statutory period set in the "Notice of Allowability" (PTO-37). Within that three month period, two weeks should be allowed for review of the new drawings by the Office. If a correction is determined to be unacceptable by the Office, applicant must arrange to have an acceptable correction re-submitted within the original three month period to avoid the necessity of obtaining an extension of time with extension fees. Therefore, applicant should file corrected drawings as soon as possible.

Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

2. Figures 3 and 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Applicant's proposed correction is acknowledged; however, it is noted that the changes were indicated in an erasable pencil. Thus, the proposed correction does not represent a highlighted sketch of the changes as indicated above. Should Applicant resubmit the correction with the changes indicated in red ink or otherwise highlighted, the correction will be approved by the Examiner.

Claim Rejections - 35 U.S.C. § 112

3. Claims 1-2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 4, it is unclear with what the "surface" is coincident; on line 32, it is unclear from what the word line is being insulated, or where the second layer is located.

In claim 2, line 4, and in claim 3, line 5, it is unclear how a surface (a two dimensional entity) can act as or form a drain region, which conventionally is a three-dimensional entity, such as a portion of a layer having a thickness.

In claim 3, lines 22-23, the "word line contact" and "bit-line contact" lack antecedent basis.

Claim Rejections - 35 U.S.C. § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by Mori.

Regarding claim 2, Mori discloses a non volatile memory cell array comprising a plurality of EEPROM memory cells 20 (Figs. 1a-1b), each cell comprising: a semiconductor substrate 11; a vertical MOS transistor formed by alternating N-type and P-type doped layers 32, 36, and 34 in said substrate, and a well 22 etched (col. 8, lines 46-52) into the substrate and penetrating the doped layers so that the layers surround the well; the well having a floating gate FG formed therein which does not extend laterally beyond edges of the well (it extends over GO, but not outside the well) and insulated from and overlying the doped layers by gate oxide GO; It is noted that layer GO can be visualized as having different components covering the bottom and sides of the well, and that the floating gate FG overlies the intersection of the well with buried layer 36, buried layer 36 having opposite conductivity type than regions 32 and 34, and that the program gate PG is a portion of the word line 38 (col. 5, lines 51-56). It is noted that in Mori's disclosure the portion of substrate 11 below layer 32 does not perform any function beside supporting the device. Mori also discloses a n-type drain 24 at the surface of the substrate, a buried p-type channel layer 36; a n-type source layer 32 below the channel, and a bitline which inherently makes contact with the drain layer and is over the substrate surface, as it is coincident with them. Mori further discloses a second layer of insulating

material (the oxide portion extending over the substrate surface, not labelled) which insulates at least a portion of the word line, as it is one of the insulating layers interposed between a portion of the word line and a portion of the drain/bit line.

Claim Rejections - 35 U.S.C. § 102/103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 and 3/4-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mori.

Mori's disclosure is discussed above.

Regarding claim 1, Mori also discloses a word line contact PG (col. 9, lines 51-53) comprising a layer of conductive material (col. 9, lines 37-44) extending into the well and overlying the floating gate being insulated from it by layer ILO. Mori also discloses bit lines BL extending along directions perpendicular to the word lines WL (Fig. 3). A bit line contact 34a comprising a layer of conductive material in contact to drain layer 34 is assumed inherent to Mori's disclosure, as Mori shows an opening in insulating layer GO for said contact (col. 5, lines 35-37, and Fig. 1a), and such contact is necessary for the proper functioning of the device. Thus, Mori discloses all the structural elements of claim 1.

Concerning the gate being self-aligned, it is noted that the limitation is a process limitation while the claim is drawn to a structure. A product by process claim is directed to the product per se, no matter how actually made. See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al, 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "process by product" claim, and not the patentability of the process. See also MPEP 2113.

Should Applicant assert that Mori does not explicitly show the bit line contact, then it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the device with a bit line contact to the transistor drain extending into opening 34a disclosed by Mori. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to do so as such bit line contact was necessary for the operation of the memory cell.

Regarding claim 3 as applied to claim 4, the bit line is in contact with the first layer as it is coincident with it. Whether a "word line contact" is to be identified with the upper portion of PG or with a separate contact whose formation would be obvious to one of ordinary skill in the art, the oxide on the upper surface of the substrate can be considered a spacer layer insulating the word line and bit line contacts, as it is one of the layers interposed between these structures.

Regarding claim 4, the bit line inherently contacts the first layer at all points, as it is coincident with it.

Claim Rejections - 35 U.S.C. § 103

8. Claims 3/5 and 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori. Mori's disclosure is discussed above.

Regarding claim 3 as applied to claim 5, a word line contact is assumed to be inherent to Mori, as the line needs to be set at specified voltages for the proper functioning of the device. It is assumed to be inherent to Mori that such a contact would be formed above PG, in analogy to the bit line contact in 34a, as this is the conventional way of forming contacts.

Mori does not disclose a spacer layer of insulating material insulating the word line contact from the bit line contact.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form an insulating spacer over the word line prior to formation of the bit line as a necessary process step subsequent to the process step shown in Mori's Figs. 1a-1b. Such spacer would inherently insulate the word line and bit line contacts. The rationale is as follows: one of ordinary skill in the art at the time the invention was made would have been motivated to do so to isolate the word lines from the bit lines, as said lines overlap as shown in Mori's Fig. 3 and their isolation is necessary for the proper function of the device.

Response to Arguments

9. Applicant's arguments filed November 19, 1997, have been fully considered but they are not deemed to be persuasive.

Applicant's amendment has overcome the original 112 2nd issues. New 112 2nd rejections have been necessitated by the amendment.

Concerning self alignment, it is noted that the limitation is a process limitation, as discussed above. It could be conceivably possible to define a self-alignment procedure to form Mori's floating gate. Mori does not show or disclose portions of the gate extending beyond the well. Thus, it is maintained that Mori discloses all the structural elements of claim 1. The claim language does not require the floating gates to be completely contained in the well, or set forth the cell size. Limitations in the specification cannot be read into the claims for the purpose of avoiding the prior art. See In re Self, 213 USPQ 1,5 (CCPA 1982) and In re Prater, 162 USPQ 541, 550-51 (CCPA 1969).

Concerning the advantages of Applicant's invention, pointed out by Applicant regarding claim 3, and the differences between Mori's and Applicant's invention it is noted that the claim language does not recite the advantages or clearly set forth the structural differences between the two inventions. See above.

The new grounds of rejection were necessitated by the amendment. Consequently, this rejection is made final.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adriana Giordana whose telephone number is (703) 308-1293 and whose fax number is 703-308-7722. Any inquiry of a general nature or relating to the status of this application should be directed to the Main Desk whose telephone number is (703) 305-3900.

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER

AG

Adriana Giordana

March 3, 1998